STUDY AND IMPLEMENTATION OF LEAN MANUFACTURING TOOL - 5S'

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ABSTRACT- Lean manufacturing is an approach focused on improving quality; reducing variation and eliminating waste in an organization. This research provides a roadmap and implementation of lean manufacturing tools in manufacturing industries. The main objective of this paper is the study, analysis of improvements about different manufacturing industries such as manufacturing of S.G Iron and Alloy Cast Iron ,Nonferrous Aluminum products ,Corrugated boxes Industry, manufacturing heat exchanger and last one is manufacturing of Radiator ,Sealing Gasket etc. where the entire project has been done. Getting these improvements, using the initial resources, it is obtained some benefits, adding more production and easiness to work in general. Also there is an improvement in terms of quality

To make the project, gather data tools have been used. Applying lean Tools and formats, an initial study has been made and then proposal improvements. After analyze the results, it is possible to show positive conclusion using LM as an optimization method, because currently, there is more space less time used and better quality in the final product.

These papers represent the one case study in radiator manufacturing company, where the 5S'tool implemented. The main Objectives are decreasing Inventory, more Utilization of space, Reduce Wastages.

Index term- Lean Manufacturing, 5S' Gap Analysis chart

I. INTRODUCTION

Lean manufacturing is a business philosophy that continuously improved all process involved in manufacturing process irrespective of what type of product being manufactured. India is one of the fastest growing economics of the world. It is provides highest level of customer service through systematic and continuing searching non-value-added activities and wastes and eliminating them. Lean Manufacturing is mainly adopted by organizations in order to reduce wastes and improve the quality of products. In India small and medium scales industry has been very successfully in improving quality of products, because products are tested at each every step in the manufacturing process .The concept of lean production arrived to India in the mid 1980's from Japan and united states of arriving, but it was mostly the larger companies that adopted the techniques now the small and medium companies has started to the Lean manufacturing concept's. This gives the extra edge in today's cost and time competitive in small & medium scale Industry in Indian Markets, they are Price, and Quality and delivery Lean enterprise owners can deliver high quality products with low prices.

II. LITERATURE REVIEW

During the research review, we found that Lean thinking constraints in traditional batch manufacturing environments[1], Development of 5s Practice checklist for environment,

housekeeping and manufacturing organization Manufacturing Industry[2]. Lean methodologies for economically and environmentally sustainable foundries[3] is often seen as a set of tools that reduce the total cost and improve the quality of manufactured products the lean management is philosophy is one which targets waste reduction in every facet of the manufacturing business. Metal casting industries are actively involved to reduce the scrap rejection and rework during the manufacturing process of the components. To achieve these production concerns must follow the quality control procedures correctly and timely implementation of the lean manufacturing [4]. The lean manufacturing of small industry could Implementation the philosophy in own contend lean production concept successfully, an investigation in two middles sizes industries, India[10]. Value stream mapping technique involves flowcharting the steps, activities material flows, communications and other process elements that are involved with a process or transformation. In this respect, value stream mapping helps an organization to identify the non –value –adding elements in a targeted process. Different flow layouts are selected that reduces the transport time [6], production lead-time and lower –in-process inventory [8]. The proposed framework for lean sigma implementation need to be validated in different scenarios for establishing its validity[5] and the ultimate goal of this system is to focus on achieving total communication efficiency that uses Green and lean TQM system[7]. Lean manufacturing philosophy asks for elimination of wastes widen in the manufacturing system by focusing on products value stream and eliminating non value adding activities through continuous improvement [9]. An equipment replacement decision problem within the context of lean manufacturing implementation. In particular, we demonstrate how the value stream mapping suite of tools can be used to map the current state map the current state of a production line and design a desired future state. We provide a roadmap for how VSM can provide necessary information for analysis of equipment replacement Decision problem encountered in lean manufacturing [11].

III. CONCLUSION FROM LITERATURE REVIEWS

From the literature review, we conclude that in the different direction, the various researches done on the lean manufacturing tools and techniques but there are less number of company aware about the LM tools and implementation of the same. So we implemented the 5s' concept in the company.

IV. LEAN MANUFACTURING TOOLS AND TECHNIQUES

The core of Lean is based on the continuous pursuit of improving the processes, a philosophy of eliminating all non-value adding activities and reducing waste within an organization. The Value adding activities are simply only those things the customer is willing to pay for, everything else is waste, and should be eliminated, simplified, reduced, or integrated.

There are a number of Lean techniques available such as, Value Stream Mapping, Visual Workplace, Setup Reduction, Cellular/Flow Manufacturing, Pull Systems and Total Productive Maintenance just to name a few; however, it is absolutely essential that Lean is viewed from a total system perspective. Otherwise, either a company risks putting all of its efforts into the wrong areas, and/or the improvement process will come to a grinding halt after the initial project.

V. CASE STUDY

1. COMPANY PROFILE:

- **Name and Address:**
  Banco Products(India) limited
  BIL padara road
  Near bhaili railway station
  Vadodara
- **Product:** Gasket, Oil Seal & Radiators
- **Turn Over:** 20 cr.
- **Working people:** 40 per 2 shift

2. REASON FOR IMPLEMENTATION

Gap analysis of the company, so we can get the clear idea about scope of work (Refer Table no.1). It is found that many area scopes of 5s in this company.

3. IMPLEMENTATION OF 5S

Step 1 –Sort Out –Remove all items from the workplace that workplace that are not needed for current operations.

Figure 1: Improper arrangement of the parts (Jigs / Tooling)mm

5S GAP ANALYSIS SHEET

DATE: 1/12/2012
COMPANY NAME: BANCO Products (India) LTD.

SR NO	ITEM	0	1	2	3	4	COMMENTS
1	Are all notices and other information available in the Work area upto Date			2			in testing and store area not identified
2	Is unused equipment and machinery eliminated from the plant			2			unused equipment parts are store in store area
3	Is obsolete inventory and raw material eliminated from the plant			2			
4	Are doorways free from material and blockages			2			
5	Are safety instructions and guide line display				3		safety instructions are given by Supervisor but not Display
6	Are all work area boundries clearly marked			2			
7	Are storage places for all work in progress designated and marked			2			
8	Are storage places for all tools and equipment properly maintain record			2			only machinary record found and properly storage of tools but not keep record
9	Are all machinary, storage euipment and colunms identified and labled	0					
10	Are all pipes, controls, and gauges identified and labled				3		identification on finish goods are found but semifinished and raw material are not found
11	Is the plant free from trash and dirt				3		at certain interval cleaning is done
12	Is the floor free from all foreign material				3		in production area increase freqency of cleaning
13	Are machines clean and good repair				3		
14	Are sources of dust, dirt and foreigh material under control		1				
15	Are oil analysis and other techniques used to gauge machine condition		1				
16	Are cleaning and checking schedule available and in documented use		1				cleaning schedule prapared but not followed regularly
17	Are up to date work instructions, including quality checks available and in use at all work station		1				work instruction are found but not displayed at all work station
18	Are all bins and parts properly identified and tagged		1				
19	Are gauages and indicator labled to clearly show the normal operating range		1				
20	Are all start up safety checks carried out and documented			2			
21	Is everyone wearing proper safety shoes, glowes, safety glass			2			
22	Are all unused tools and equipment properly stored				3		in store area some parts of unused equipment
23	Are all raw materials and work in progress properly stored			2			properly stored but not identified area
24	Are all personnel fully trained in the tasks they are responsible for, and regularly tested			2			
25	Is there a regular auditing process to verify compliance with all elements of the production and safety system			2			by external consultants ISO internal audit carried out
	TOTAL		**45**	**45/100**			**45%**

Scoring Method		
0='NO', where the only choise is '0' or'4', otherwise it means 'not at all'.		
1=some evidence of a plan but very little conformance		
2=about half the instances noted were in conformance		
3=instances note were mostly in conformance, but one or more problems were		
4='yes'.where the only choise is '0',or'4',otherwise complete conformance with		

Implementation Criteria

Score	Target of implementation days
if<20	365-500
if 20-40	250-300
if 40-70	150-250
if more than 70	if more than 70

Table 1: Gap Analysis Sheet of BANCO Products India LTD.

Step-2 – Set In Order – Arrange needed items so that they are easy to find, use and put away.

Before implementation   After implementation

Figure 2: Shows the status before and after implementation of 5S

Figure 3: Right thing is in right place

Spatter removing after welding

Before   After

Figure 4: Implementation status before & after of 5S within 2 months

Step 3: (Clean Lines) shine every things, everything is dust free (clean and safe work plan)

Neat & clean gang ways painted floor

No leakage of oil on the material &shop floor

Figure 5: Shows the Status after 5 Month Implementation of the Shop Floor

Shop floors shine everything Dust free environment

Figure 6: Shows the Status after 5 Month Implementation of the Shop Floor

Step 4- Standardization

Work station layout, work Area layout, and work in process

Air Line

Liquid/ Lubrication Line

Figure 7: Implementation of the color coding

In sustains the benefits achieved by implementing 1s, 2s & 3s.avoids Re-occurrence, in all the process continuity of work and also provides guidelines for the new people

STEP 5–SELF–DISCIPLINE (follow the standards)

Figure 8: Whatever has been decided must be followed exactly as per standard

Sr. No	Indent ified waste	Befo re 5S	targ et	Actu al after 4 mont h	Targ et after 7 mont h	Actu al	Tar get after 12 mon th
1	Space utilizat ion	10%	30%	10%	40%	20%	60%
2	Break down hours	6 Hrs	1 Hrs	2 Hrs	1 Hrs	1.5 Hrs	0.5 Hrs
3	Search time of goods	45 Min	15 Min	20 Min	10 Min	15 Min	6 Min

Table 2: 5S Result of case study

VI. CONCLUSION

According to case study, we conclude that lean tools can be used effectively in any kind of sectors as it is a world class manufacturing tool. The prime objective is to carry out process activity mapping for waste reduction. In this study bottleneck product was identified. Further value stream analysis tool was employed for identification of wastes in a process. The significance of each type of the error was studied and waste ranking was

carried out. Current state map is plotted to assess current status, waste elimination techniques are presented and future state map is also preferred for improvement. The result of study shows 20% waste reduction in the area of unnecessary inventory, transportation and waiting. A 5S and Value stream mapping tools can be effectively employed to reduce wastes and ultimately improve the process.

IV. FUTURE *RESEARCH*

There is an infinite number of ways of implement Lean Manufacturing in these Industries. In this project Value Stream Mapping is done theoretically but in actual practice it can be useful. Many industries are not aware of these tools. Regarding Implementation of 5s it is popular at higher management level, but by referring this project it will be popular in a worker also. By using 5s and Value Stream Mapping moral of workers can be increased. But this is possible in future by conducting training program of such type.

V. ACKNOWLEDGEMENT

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